```
(* THE VERY BASIC (1) *)
5 / 6
3 + 4
9 ^ 2
E ^ (I Pi)
Pi
N[Pi]
```

$\dfrac{5}{6}$

7

81

-1

π

3.14159

```
(* THE VERY BASIC (2) *)

3 + 4
% / 2
N[%]
10 * 10 == 100
10 < Exp[10]
10 < Log[10]
```

7

$\dfrac{7}{2}$

3.5

True

True

False

```
(* THE VERY BASIC (3) *)
(x - 1) (x + 1)
Simplify[%]

(x + 1) (x + 2) (x + 3)
Expand[%]

x^10 - 1
Factor[%]
```
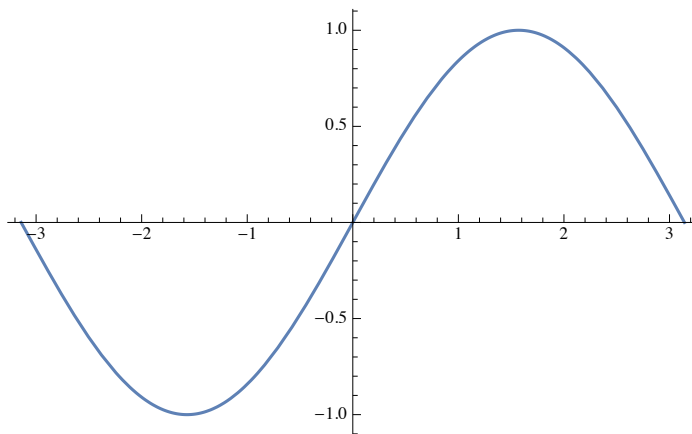
$(-1 + x) \ (1 + x)$

$-1 + x^2$

$(1 + x) \ (2 + x) \ (3 + x)$
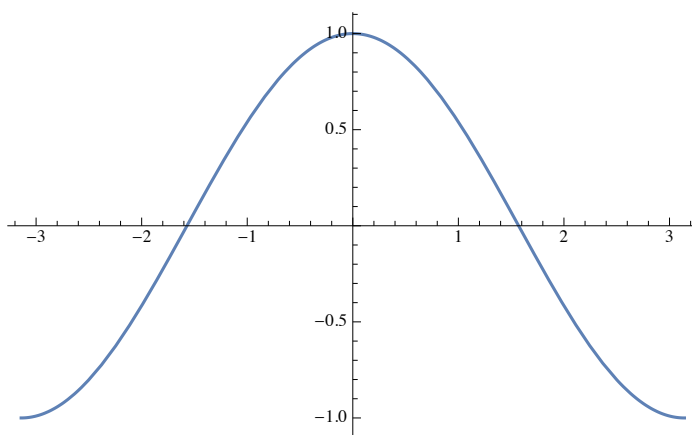
$6 + 11 \, x + 6 \, x^2 + x^3$

$-1 + x^{10}$

$(-1 + x) \ (1 + x) \ (1 - x + x^2 - x^3 + x^4) \ (1 + x + x^2 + x^3 + x^4)$

```
(* DEFINITION *)

a = 1
b = 2
a + b
a * b
y = Sin[x]
Plot[y, {x, -Pi, Pi}]
```

1

2

3

2

Sin[x]


```
(* The last command (Plot[y,{x,-Pi,Pi}]) is not recommended. Instead,
you should define a function. *)
f[x_] := Cos[x]
f[Pi]
f[Pi / 2]
Plot[f[x], {x, -Pi, Pi}]
```

- 1

0

```
(* Substitution (VERY IMPORTANT!) *)
y = Sin[x] + Cos[x]
```

$\text{Cos}[x] + \text{Sin}[x]$

```
y /. {x → 4}
```

$\text{Cos}[4] + \text{Sin}[4]$

```
y /. Sin → Tan
```

$\text{Cos}[x] + \text{Tan}[x]$

```
y /. {Sin → Exp, x → 4}
```

$e^4 + \text{Cos}[4]$

```
ReplaceAll[y, x → 4] (* /. is a syntax suger of ReplaceAll. *)
```

$\text{Cos}[4] + \text{Sin}[4]$

```
(* REPEATED substitution *)
```

```
energy = m * gamma
ReplaceAll[energy, {gamma → 1 / Sqrt[1 - beta^2], beta → v / c}]
```

$\text{gamma } m$

$$\frac{m}{\sqrt{1 - \text{beta}^2}}$$

```
ReplaceRepeated[energy, {gamma → 1 / Sqrt[1 - beta^2], beta → v / c}]
```

$$\frac{m}{\sqrt{1 - \frac{v^2}{c^2}}}$$

```
(* ReplaceRepeated has a syntax sugar //. *)
energy //. {gamma → 1 / Sqrt[1 - beta^2], beta → v / c}
```

$$\frac{m}{\sqrt{1 - \frac{v^2}{c^2}}}$$

```
(* EMERGENCY EXIT *)
(* ALT(or command)+period if you want to stop evaluation. *)
Integrate[(Sin[x] + Tan[x])^100, x]
(* You can stop evaluation from the menu: Evaluation>Abort Evaluation. *)
```

$Aborted

```
(* This is important when you induce an infinite-evaluation. *)
Sin[x] /. x → Sin[x]
Sin[x] //. x → Sin[x]
```

$\text{Sin}[\text{Sin}[x]]$

$Aborted

```
(* THAT'S MATHEMATICA BASIC. *)
(* Now Let's forget all == ABORT THE KERNEL. *)

energy

gamma m

Exit[]
(* Now the kernel has been initialized. Everything is now cleared. *)

energy
(* is now undefined. *)

energy

(*Note that you can clear a variable with Clear*)
abc = a + b + c
{a, b, c} = {1, 2, 3}
abc

a + b + c

{1, 2, 3}

6

Clear[a]
abc

5 + a

Clear[b, c]
abc

a + b + c
```